Module 02 – Transportation Modeling

Exploratory Data Analysis

Row Labels	Licorice Labyrinth	Licorice Lanes	Malted Milk Manor	Peppermint Peninsula	Sugar Swirl Spires	Swedish Fish Shores
Bubble Pop Borough	$ 0.17	$ 0.09	$ 0.12	$ 0.11	$ 0.15	$ 0.17
Buttercream Beach	$ 0.19	$ 0.17	$ 0.13	$ 0.14	$ 0.12	$ 0.12
Cinnamon Swamp	$ 0.10	$ 0.11	$ 0.14	$ 0.05	$ 0.17	$ 0.09
Gingerbread Glades	$ 0.18	$ 0.17	$ 0.18	$ 0.05	$ 0.15	$ 0.10

Average Total Cost Per Destination	
Swedish Fish Shores	$1,739.15
Pepermint Peninsula	$2,354.24
Licorice Labyrinth	$1,294.65
Licorice Lanes	$2,044.56
Malted Milk Manor	$2,153.02
Sugar Swirl Spires	$2,229.16

Model Formulation

MIN:
Location 1: .17x^15 +.09x^16+ .12x^17+.11x^18+.15x^19+.17x^110
Location 2: .19x^15 +.17x^16+ .13x^17+.14x^18+.12x^19+.12x^110
Location 3: .10x^15 +.11x^16+ .14x^17+.05x^18+.17x^19+.09x^110
Location 4: .18x^15 +.17x^16+ .18x^17+.05x^18+.15x^19+.10x^110

Constraints:
Location 1- x15+x16+x17+x18+x19+x110 (Bubble Pop Borough)
Location 2 – x25+x26+x27+x28+x29+x210. (Buttercream Beach)
Location 3 – x35+x36+x37+x38+x39+x310. (Cinnamon Swamp)
Location 4 – x45+x46+x47+x48+x49+x410. (Gingerbread Glades)
Location 5 – x55+x56+x57+x58+x59+x510 (Licorice Labyrinth)
Location 6 – x65+x66+x67+x68+x69+x610. (Licorice Lanes)
Location 7 – x75+x76+x77+x78+x79+x710. (Malted Milk manor)
Location 8 – x85+x86+x87+x88+x89+x 810. (Peppermint Peninsula)
Location 9 – x95+x96+x97+x98+x99+x 910. (Sugar Swirl Spires)
Location 10 – x105+x106+x107+x108+x109+x 210 (Swedish fish shores)

Objective Function
x15+x16+x17+x18+x19+x110+x25+x26+x27+x28+x29+x210+x35+x36+x37+x38+x39+x310 + x45+x46+x47+x48+x49+x410+ x55+x56+x57+x58+x59+x510+ x65+x66+x67+x68+x69+x610+ x75+x76+x77+x78+x79+x710+ x85+x86+x87+x88+x89+x 810+ x95+x96+x97+x98+x99+x 910+ x105+x106+x107+x108+x109+x 210

Model Optimized for Profit

Row Labels	Licorice Labyrinth	Licorice Lanes	Malted Milk Manor	Peppermint Peninsula	Sugar Swirl Spires	Swedish Fish Shores
Bubble Pop Borough	$ 0.17	$ 0.09	$ 0.12	$ 0.11	$ 0.15	$ 0.17
Buttercream Beach	$ 0.19	$ 0.17	$ 0.13	$ 0.14	$ 0.12	$ 0.12
Cinnamon Swamp	$ 0.10	$ 0.11	$ 0.14	$ 0.05	$ 0.17	$ 0.09
Gingerbread Glades	$ 0.18	$ 0.17	$ 0.18	$ 0.05	$ 0.15	$ 0.10

Row Labels	Licorice Labyrinth	Licorice Lanes	Malted Milk Manor	Peppermint Peninsula	Sugar Swirl Spires	Swedish Fish Shores	Amount	Capacity
Bubble Pop Borough	$ -	$ 91.00	$ 11.00	$ -	$ -	$ -	102	102
Buttercream Beach	$ -	$ -	$ 89.00	$ -	$ 87.00	$ -	176	176
Cinnamon Swamp	$ 62.00	$ -	$ -	$ -	$ -	$ 49.00	111	111
Gingerbread Glades	$ -	$ -	$ -	$ 88.00	$ -	$ 50.00	138	138
SUM	62	91	100	88	87	99		
Demand	103	91	100	88	87	99		

TOTAL	$ 51.53

The optimal solution will cost 51.53 dollars.

Model with Stipulation

Please copy the tab of your original model before continuing with the next part to avoid messing up your original solution. What happens if you add an additional constraint to the model such that all demand MUST be met. Is the solution still feasible? If not, please explain why.

In the model, when changing the constraints to all demand should be met the solution is not feasible because it is impossible to meet all the constraints of the graph.